

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/12322

## A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl<sup>7</sup> C07D213/22, 215/04, 219/02, 239/26, 241/42, 251/24,  
253/06, 401/04, 471/04, 487/04, C09K11/06, H05B33/14,  
33/22

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl<sup>7</sup> C07D213/22, 215/04, 219/02, 239/26, 241/42, 251/24,  
253/06, 401/04, 471/04, 487/04, C09K11/06, H05B33/14,  
33/22

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CAPLUS (STN), REGISTRY (STN)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2001-35664 A (MITSUI CHEMICALS, INC.), 09 February, 2001 (09.02.01), Full text; particularly, Claim 7; illustrative compounds A-28, 32, 53, 81, 92, 114, B-15, A-27, 49, 63, 64, 71-75, 94, 100, 117 (Family: none)	1, 4, 5, 7, 9-20 1-3, 6-8, 14-20
X Y	JP 2001-43978 A (MITSUI CHEMICALS, INC.), 16 February, 2001 (16.02.01), Full text; particularly, Claim 7; illustrative compounds A-49, A-50, 51, 70, 75, 76 (Family: none)	1, 4, 7, 9, 10, 12-20 1-3, 6-8, 14-20

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:  
 "A" document defining the general state of the art which is not  
 considered to be of particular relevance  
 "E" earlier document but published on or after the international filing  
 date  
 "L" document which may throw doubts on priority claim(s) or which is  
 cited to establish the publication date of another citation or other  
 special reason (as specified)  
 "O" document referring to an oral disclosure, use, exhibition or other  
 means  
 "P" document published prior to the international filing date but later  
 than the priority date claimed

"T" later document published after the international filing date or  
 priority date and not in conflict with the application but cited to  
 understand the principle or theory underlying the invention  
 "X" document of particular relevance; the claimed invention cannot be  
 considered novel or cannot be considered to involve an inventive  
 step when the document is taken alone  
 "Y" document of particular relevance; the claimed invention cannot be  
 considered to involve an inventive step when the document is  
 combined with one or more other such documents, such  
 combination being obvious to a person skilled in the art  
 "&" document member of the same patent family

Date of the actual completion of the international search  
 14 November, 2003 (14.11.03)

Date of mailing of the international search report  
 09 December, 2003 (09.12.03)

Name and mailing address of the ISA/  
 Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2001-6877 A (Toray Industries, Inc.), 12 January, 2001 (12.01.01), Full text; particularly, Claim 2; compounds in Par. Nos. [0031] to [0035], [0037] to [0041]; examples 3, 4 (Family: none)	1, 3-20 1-3, 6-8, 14-20
X Y	JP 2002-235075 A (Fuji Photo Film Co., Ltd.), 23 August, 2002 (23.08.02), Full text; particularly, compounds in Par. Nos. [0024] to [0026]; examples 1, 4, 5 (Family: none)	1-3, 6-8, 14-20 1-3, 6-8, 14-20
X Y	JP 2001-223082 A (Toray Industries, Inc.), 17 August, 2001 (17.08.01), Full text; particularly, compounds in Par. Nos. [0036], [0037]; examples 2, 4, 6 (Family: none)	1, 3, 7, 8, 14-20 1, 3, 7, 8, 14-20
X Y	WO 02/088274 A1 (LG CHEM., LTD.), 07 November, 2002 (07.11.02), Full text; particularly, examples (for example, CAS RN: 474688-30-7, 474688-32-9, 474688-35-2, 474688-36-3) & EP 1294823 A1	1-4, 6, 8, 14-20 1-3, 6, 8, 14-20
X	WO 02/100977 A1 (Sanyo Electric Co., Ltd.), 19 December, 2002 (19.12.02), Full text; particularly, compounds 1 to 27 & JP 2003-55652 A	1, 2, 6, 7, 14-20
X	US 5077142 A (RICOH CO., LTD.), 31 December, 1991 (31.12.91), Full text; particularly, Claim 5 (Family: none)	1, 4, 14-20
X	US 6461747 B1 (FUJI PHOTO CO., LTD.), 08 October, 2002 (08.10.02), Full text; particularly, columns 21 to 60 & JP 2001-335776 A & US 2003/091861 A1	1, 2, 6, 8, 14-20
X	JP 11-329732 A (Toppan Printing Co., Ltd.), 30 November, 1999 (30.11.99), Full text; particularly, Claim 3; examples 2, 3 (Family: none)	1, 2, 6, 8, 14-20
X	JP 10-152676 A (TOYO INK MANUFACTURING CO., LTD.), 09 June, 1998 (09.06.98), Full text; particularly, Par. No. [0029] (Family: none)	1, 2, 6, 8, 14-20

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1061112 A1 (IDEMITSU KOSAN CO., LTD.), 20 December, 2000 (20.12.00), Full text; particularly, compound 67 & WO 00/39247 A1 & US 2003/072966 A1 & JP 2001-52868 A	1, 2, 6, 14-20
X	JP 2002-265938 A (TOYO INK MANUFACTURING CO., LTD.), 18 September, 2002 (18.09.02), Full text; particularly, table 1 (Family: none)	1, 3, 7, 8, 14-20
X	EP 1221434 A1 (MITSUI CHEMICALS, INC.), 10 July, 2002 (10.07.02), Full text; particularly, compounds B-3, 4, 8, 20, 34 & US 2003/087126 A1 & WO 02/14244 A1 & JP 2002-154993 A	1-4, 8, 14-20
X	JP 2001-110572 A (Toyota Central Research And Development Laboratories, Inc.), 20 April, 2001 (20.04.01), Full text; particularly, examples 18, 19, 21 (Family: none)	1, 3, 8, 14-20
X	EP 1167488 A1 (IDEMITSU KOSAN CO., LTD.), 02 January, 2002 (02.01.02), Full text; particularly, compounds EM6, 27, 28 & US 6534199 B1 & WO 01/21729 A1	1-3, 8, 14-20
X	JP 11-111458 A (TOYO INK MANUFACTURING CO., LTD.), 23 April, 1999 (23.04.99), Full text; particularly, table 1, compounds 6, 11, 12, 26 (Family: none)	1-5, 8, 14-20
X	EP 786926 A2 (TOYO INK MANUFACTURING CO., LTD.), 30 July, 1997 (30.07.97), Full text; particularly, table 1, compounds 13 to 19 & US 5811834 A & JP 9-268283 A	1, 2, 6, 8, 14-20
E, X E, A	JP 2003-277743 A (IDEMITSU KOSAN CO., LTD.), 02 October, 2003 (02.10.03), Full text; particularly, compounds in Par. Nos. [0012] to [0015] (Family: none)	1, 4-6, 14-20 2, 3, 7-13
P, X P, A	JP 2003-238534 A (IDEMITSU KOSAN CO., LTD.), 27 August, 2003 (27.08.03), Full text; particularly, compounds in Par. No. [0030] (Family: none)	1, 3, 7, 8, 14-20 2, 4-6, 9-13

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X P,A	JP 2003-229273 A (MITSUI CHEMICALS, INC.), 15 August, 2003 (15.08.03), Full text; particularly, compounds in Par. Nos. [0077] to [0080], [0083], [0246], [0247], [0257] to [0262] (Family: none)	1-4, 6, 8, 14-20 5, 7, 9-13
P,X P,A	JP 2003-128651 A (MITSUI CHEMICALS, INC.), 08 May, 2003 (08.05.03), Full text; particularly, compounds in Par. Nos. [0081] to [0195] (Family: none)	1-3, 7, 8, 14-20 4-6, 9-13
P,X P,A	JP 2003-109765 A (Canon Inc.), 11 April, 2003 (11.04.03), Full text; particularly, compounds 15, 18 in Par. No. [0056]; compounds 39, 42 in Par. No. [0060] (Family: none)	1, 3, 7, 8, 14-20 2, 4-6, 9-13
P,X P,A	JP 2003-109763 A (Canon Inc.), 11 April, 2003 (11.04.03), Full text; particularly, compounds 10 in Par. No. [0113] (Family: none)	1, 3, 8, 14-20 2, 4-7, 9-13
X A	US 4965302 A (MITSUBISHI KASEI CORP.), 23 October, 1990 (23.10.90), Full text; particularly, preparation examples; examples & EP 335595 A2 & JP 1-247451 A & JP 1-247452 A	1, 2, 6, 8 3-5, 7, 9-20
X A	WO 00/78726 A1 (ELI LILLY AND CO.), 28 December, 2000 (28.12.00), Full text; particularly, examples 193, 195, 201 to 209, 294 & GB 2351081 A	1, 4, 9-13 2, 3, 5-8, 14-20
X A	HAN, Xiaochun et al., The isoxazole as a linchpin for molecules that target folded DNA conformations: selective lateral lithiation and palladation, Tetrahedron Letters, 2002, Vol.43, No.43, pages 7673 to 7677, compounds 6 to 8 in Scheme 1.	1, 3, 7, 8 2, 4-6, 9-20
X A	AOYAMA, Yasuhiro et al., Crystal Engineering of Stacked Aromatic Columns. Three-Dimensional Control of the Alignment of Orthogonal Aromatic Triads and Guest Quinones via Self-Assembly of Hydrogen-Bonded Networks, Journal of the American Chemical Society, 1996, Vol.118, No.24, pages 5562 to 5571, compound 2 in Scheme 1.	1, 3, 4, 8 2, 5-7, 9-20

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	DODGE, Jeffrey A. et al., Regioselective synthesis of substituted rubrenes, Journal of Organic Chemistry, 1990, Vol.55, No.13, p.4190-8, compound 47 in table II.	1, 3, 4, 7 2, 5, 6, 8-20
X A	FORRESTER, Alexander R. et al., Iminyls. Part 4. Intramolecular abstraction of benzylic hydrogen by diaryliminyls, Journal of the Chemical Society, Perkin Transactions 1: Organic and Bio-Organic Chemistry (1972-1999), 1979, No.3, p.621-31, compounds 24 in SCHEME 3;	1, 3, 7, 8 2, 4-6, 9-20
X A	PUCHKOV, V.A. et al., Transformation in the series of diazoamino compounds. II. Thermal decomposition of substituted an thraquinonylphenyl-1,3-triazenes, Zhurnal Obshchej Khimii, 1959, Vol.29, p.3058-64, (CAS RN:102884-40-2)	1, 3, 4, 7, 8 2, 5, 6, 9-20

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## Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

A technical feature common to claims 1-20 resides in compounds having as a common partial chemical structure a nitrogenous heterocycle comprising rings bonded. However, compounds having the common partial chemical structure are known [see, for example, JP 2001-35664 A (Mitsui Chemicals, Inc.) 09 February, 2001 (09.02.01)].

Claims 1-20 are hence considered not to have a common technical feature exceeding the prior art. Consequently, claims 1-20 are not so linked as to form a single general inventive concept.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
  
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

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## <With Respect to Scope for Search>

Claims 1-20 involve an extremely large number of compounds. However, the compounds which are supported by the description in the meaning of Article 6 of the PCT and are disclosed in the meaning of Article 5 of the PCT are limited to an extremely small part of the compounds claimed.

On the other hand, a search was made through prior-art documents in view of the statements in the description. In part of the search, many compounds falling under the category of the claimed compounds were found. There also are many compounds which may fall under the category of the claimed compounds. It is virtually impossible to thoroughly investigate and show all the documents in which those compounds are shown.

Therefore, in this international search report, a search was made for the part supported by and disclosed in the description within the range of a reasonable burden.